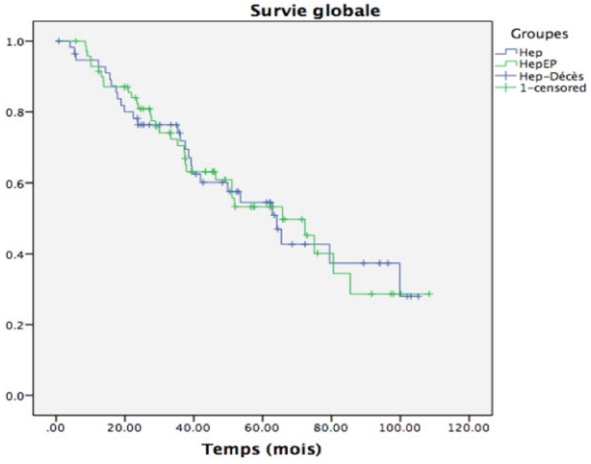
difference in complication rates between the groups (p = 0.465) and there was no peri-operative mortality. Hospital stay was shorter in the PVE group (7.84 VS 8.95 d, p = 0.038). 5-year overall survival rate and disease free survival rate were similar between groups (53.2% VS 54.4%; p = 0.999 and 38.3% VS 40.6%; p = 0.823) Median overall survival and disease free survival were 65.4 months and 33.6 months respectively, with a median overall follow-up of 39.3 months.

Conclusion: Our results showed similar survival whether PVE was used or not. Hence, PVE offers a chance for cure for patients who could not be operated upfront. Moreover, PVE patients seem to have the same prognosis even with a larger extent of disease.



LO-E.09 EVALUATING ATTITUDES TOWARD AND APPLICATION OF MECHANISMS TO AUGMENT THE LIVER IN NORTH AND SOUTH AMERICA (THE MALINSA SURVEY)

R. W. Day, C. Conrad, J. Vauthey, T. A. Aloia
Department Of Surgical Oncology, The University Of Texas MD Anderson Cancer Center, Houston, TEXAS

Introduction: Various techniques, including PVE, PVL, and ALPPS, are being used to augment the future liver remnant volume in preparation for major hepatectomy. Given the significant variation between and within these techniques, there is no scientific way to compare their safety and efficacy.

Purpose: The aim of this study was to survey and document the availability, variation, utilization and attitudes toward each of these techniques across high volume HPB centers in North and South America.

Method: A descriptive 20 question survey was developed and internally validated with expert review. The survey was IRB approved and distributed to 42 high volume centers in Canada, US, Mexico, and South America. Data were collected, collated and analyzed.

Results: Complete surveys were returned from 23 institutions, including representatives from each region (Canada, US, Mexico, and South America). All of the institutions responding performed PVE with 5 centers (21.7%) also performing ALPPS procedures. In the previous year, the average PVE and ALPPS procedures performed were 15.75 and 6.2 per instutition respectively. Only 18 (78.3%) reported the capability to extend PVE to segment 4, and 12 (52.2%) reported embolization utilizing embolic microspheres. Twenty respondents (87%) rated PVE the safest option for liver hypertrophy; however, 12 respondents (52.2%) believe the ALPPS procedure is most likely to result in adequate hypertrophy.

Conclusions: There exists extreme variability in utilization and attitudes toward the available techniques for FLR volume augmentation. Penetration of best practice techniques for PVE is lacking and may contribue toward the attraction of the riskier ALPPS procedure.

FRIDAY, MARCH 13, 2015, 5:00PM–6:30PM
ORAL POSTER I (BILIARY, EDUCATION, LIVER)

OP-I.01 T2 GALLBLADDER CANCER – STILL A NODAL DISEASE

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Methodist Dallas Medical Center, Dallas, TX

Introduction: Treatment of gall bladder cancer (GBC) has traditionally been viewed with pessimism and lymph node positivity has been associated with worse prognosis. The aim of this study is to analyze lymph node positivity in patients with T2 tumors.

Methods: All patients who underwent surgery for GBC between September 2005 and June 2014 have been identified retrospectively in our database. Data collected included clinical presentation, operative findings, and histopathological data.

Results: Charts of 36 patients were reviewed. 26 patients had incidental GBC diagnosis following cholecystectomy. 10 patients were T2 on initial cholecystectomy and all underwent subsequent radical resection. 2 patients from this group were N1 on initial cholecystectomy and 4 more patients became N1 on second surgery. Overall 60% patients with T2 disease had node positivity. 2 patients were found to have residual disease at the liver margin and were upgraded to T3 following resection, one of them also had N1 disease. Overall 50% patients with T2 disease had stage upgrade after radical resection. 10 patients were diagnosed on imaging. 3 of these patients were unresectable and 6 were either stage T3 or higher or node positive.

Conclusions: 60% of T2 GBC were node positive in our experience. 50% T2 patients found on initial

cholecystectomy have stage upgrade as a result of radical surgery. These findings support the call for radical resection in patients with incidental diagnosis of T2 tumor on cholecystectomy. This study also shows preoperative imaging diagnosis is associated with higher stage and overall worse prognosis.

OP-I.03 SUBTOTAL CHOLECYSTECTOMY FOR THE HOSTILE GALLBLADDER

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Department Of Surgery, Duke University Medical Center, Durham, NC

Background: Outcomes following the inability to safely control the cystic duct in the setting of a hostile triangle of Calot during cholecystectomy remain unknown. The purpose of this study was to analyze the safety and efficacy of subtotal cholecystectomy, with specific attention to the necessity and timing of secondary procedures.

Methods: Medical records of 16,585 cholecystectomies from January 2002-August 2014 were reviewed, with identification of patients managed with subtotal cholecystectomy, defined as the inability to isolate and transect the cystic duct. We investigated surgical indications, intraoperative variables, and 30-day postoperative mortality and morbidity. We also analyzed the necessity for ERCP, percutaneous drainage procedures, and completion cholecystectomy.

Results: 69 (0.4%) patients underwent subtotal cholecystectomy, of which 57 (82.6%) were laparoscopic; 30 (43.5%) required conversion to laparotomy. 1 (1.4%) patient died postoperatively, and 26 (37.7%) patients suffered 35 complications, most frequently infectious (14 wound/surgical site infections, 4 UTIs). Indication for cholecystectomy included acute cholecystitis (69.6%), 10 (14.5%) of which had a cholecystostomy tube, symptomatic cholelithiasis (23.2%), chronic cholecystitis (13%), and biliary pancreatitis (10.1%). Secondary interventions were required in the form of 49 ERCPs in 20 (29%) patients, percutaneous drainage for biloma or abscess in 6 (8.7%), and completion cholecystectomy on average 13.75 months (5–27 months) after the index operation in 4 (5.8%).

Conclusions: The hostile gallbladder represents a complicated disease process for which patient safety is of paramount. Postoperative morbidity after subtotal cholecystectomy is significant. Most do not require completion cholecystectomy; however, these patients demand close observation and, frequently, secondary interventions.

OP-I.04 MAJOR BILE DUCT INJURY AFTER LAPAROSCOPIC CHOLECYSTECTOMY: EXPERIENCE FROM A TERTIARY REFERRAL CENTER IN A RURAL STATE

A. Greenbaum, E. Alkhalili, I. Nir
University Of New Mexico, Albuquerque, NEW MEXICO

Background: Risk factors for iatrogenic bile duct injuries (BDI) after laparoscopic cholecystectomy (LC) remain a topic of controversy. Few studies have examined ethnicity or body mass index as potential risk factors resulting in the need for complex biliary reconstruction. We hypothesize that LC performed in a rural setting may present a higher risk of BDI in certain patient populations.

Methods: This retrospective cohort study includes all patients referred to our tertiary center from 2010–2014 for biliary reconstruction secondary to major BDI during LC.

Results: A total of 21 patients were analyzed. These patients were predominately female (76% vs. 24% male). A disproportionate number of patients were Native American (47.6% vs. 10.4% comprising the New Mexico state population). The mean BMI of all patients was 33.5, though the Native American population average BMI was 39.2. The majority of referrals came from rural centers (62%). The mean time to BDI recognition after LC was highest at rural facilities (16.4 days vs. 3.3 days at metropolitan centers) as well as the timing of referral (4.7 days vs. 0.8 days). The overall rate of morbidity was 42.8% and one patient died of sepsis prior to reconstruction.

Conclusion: Major BDI after LC is a highly morbid event. This retrospective cohort study suggests Native American patients, specifically those who are morbidly obese, may be at higher risk of BDI during laparoscopic cholecystectomy in a rural setting. We prompt rural surgeons to consider early referral of high risk patients to a tertiary setting for gallbladder surgery.

OP-I.05 RACIAL DISPARITIES IN PATIENTS WITH GALLBLADDER CANCER

S. Zenoni[1], X. Zhu[1], P. Velduis[1], S. Eubanks[1,2], P. Arnoletti[1,2], S. De La Fuente[1,2]
[1]Florida Hospital Orlando, Orlando, FL; [2]University Of Central Florida, Orlando, FL

Background: Epidemiological studies have shown widely variable geographic patterns in patients with gallbladder cancer. The incidence rates are extraordinarily high in Latin America, Asia and some countries in eastern and central Europe but relatively low in the United States. In contrast to other biliary malignancies, there is limited data regarding racial disparities and oncologic outcomes in patients with gallbladder cancer. In this study, a prospectively maintained tumor registry was used to determine overall survival, time-to-initial treatment, and time-to-surgery according to race in patients with gallbladder cancer.

Methods: Patients with gallbladder cancer registered at the Florida Hospital tumor database from the year 2001–2013 were included in the analysis. Analyzed variables included

basic demographics as well as grade and pathological ACCJ stage at diagnosis, date at diagnosis, initial treatment date, surgery date, last date of contact, patient's status (alive/dead) at the last contact, and overall survival according to race.

Results: A total 133 patients with gallbladder cancer were identified from the database; 91 of which were identified as non-Hispanic, 22 as Hispanics, and 20 as African Americans. There were no differences in age, gender distribution, grade and pathological ACCJ stage at presentations between the different races. Five-years overall survival (figure), time-to-initial treatment, and time-to-surgery were not significantly different between groups.

Conclusions: This study shows similar survival rates and time to therapy between Caucasian and minorities. Furthermore, as opposed to what it has been observed with other cancers, no differences were noted in time-to-treatment in gallbladder cancer according to race.

OP-I.06 THE IMPACT OF CONCOMITANT BILE DUCT RESECTION WITH MAJOR HEPATECTOMY ON SURVIVAL OUTCOMES OF PATIENTS UNDERGOING TREATMENT OF METASTATIC COLORECTAL CANCER: A MULTI-INSTITUTIONAL ANALYSIS OF 429 PATIENTS

L. M. Postlewait[1], M. H. Squires[1], D. A. Kooby[1], S. M. Weber[2], C. R. Scoggins[3], K. Cardona[1], C. S. Cho[2], R. C. Martin[3], E. Winslow[2], S. K. Maithel[1]

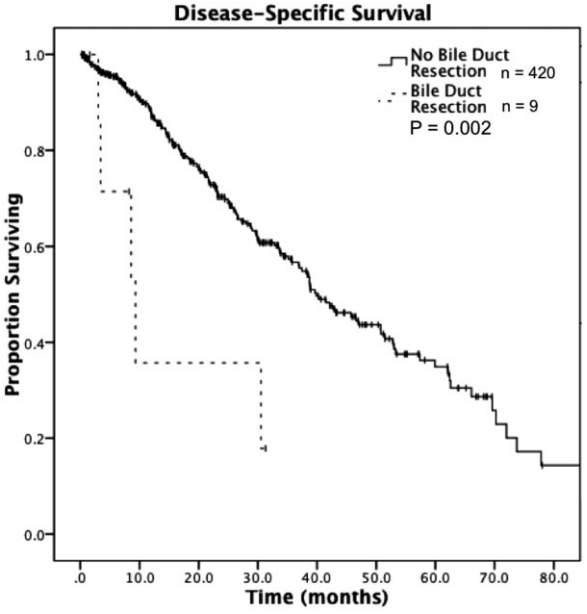
[1]Division Of Surgical Oncology, Emory University, Atlanta, GA; [2]Division Of Surgical Oncology, University Of Wisconsin, Madison, WI; [3]Division Of Surgical Oncology, University Of Louisville, Louisville, KY

Background: Data are lacking on the long-term outcomes of patients undergoing major hepatectomy requiring a bile duct resection for the treatment of colorectal cancer metastases.

Methods: All patients who underwent major hepatectomy (≥3 segments) for metastatic colorectal cancer from 2000 to 2010 at three US academic institutions were included. Patients who died from unknown cause were excluded. Primary outcome was disease-specific survival (DSS).

Results: Of 456 patients, 429 met inclusion criteria. Median follow-up was 38.7 mos. Bile duct resection was performed in 9 patients (2.1%) and was associated with preoperative portal vein embolization (25.0%vs4.3%;p = 0.049). There were no significant differences in other clinicopathologic factors between the two groups (age, ASA class, margin status, number of lesions, tumor size, cirrhosis, perineural invasion, and lymphovascular invasion). Bile duct resection was associated with increased postoperative major complications (Clavien III-V) in univariate (66.7%vs20.7%;p = 0.004) and multivariate analyses (HR: 6.22;95%CI: 1.44–26.97;p = 0.015). There were no differences in length of stay, reoperation, readmission, or 30-day mortality rates. Patients who underwent bile duct resection had shorter DSS compared with patients not requiring bile duct resection (9.3 vs 39.9 mo; p = 0.002; Figure). When accounting for differences between the two groups, the need for bile duct resection was independently associated with reduced DSS (HR: 3.06;95%CI: 1.12–8.34;p = 0.029).

Conclusion: Major hepatectomy with concomitant bile duct resection is seldom performed in patients undergoing resection of colorectal cancer liver metastases. Bile duct resection is associated with higher major morbidity and reduced disease-specific survival. Stringent selection criteria should be applied when patients may need bile duct resection during hepatectomy for colorectal cancer liver metastases.



OP-I.08 INCORPORATING TRANSITION TO PRACTICE INTO A HEPATOPANCREATICOBILIARY FELLOWSHIP: A MODEL FOR GRADUATED AUTONOMY

C. Scally, S. G. Warner, R. M. Minter

University Of Michigan, Ann Arbor, MICHIGAN

Introduction: There is significant concern for graduating trainees' readiness for independent practice. The American College of Surgeons (ACS) has developed pilot fellowships to facilitate "Transition to Practice." However, these programs currently serve as an alternative to advanced subspecialty training. We sought to evaluate our institutional experience incorporating a novel transition to practice element into an advanced HPB fellowship.

Methods: We obtained complete operative records from Fiscal Years 2012–14 through present for our HPB fellows (2011–13 fellow A, 2013–15 fellow B). We then identified all cases in which the fellows billed as the attending surgeon, as well as all cases in which they participated as a trainee. We also analyzed relative value units (RVUs), and total charges billed by the fellows per financial year.

Results: The independent practice element expanded in each year of the fellowship (Table). Independent cases represented 36.6% of the fellows' total operative volume from 2012–14. In the second year of the fellowship, the fellows have increased the complexity of diagnoses seen in their personal clinic with explicit recognition of their ability to progress in this manner. The fellows do not participate in either emergency or service call as an attending.

Conclusions: Our HPB fellows' training included a significant independent practice component, with an expanding scope of practice in each year of training. This method of graduated autonomy in an advanced HPB fellowship may represent a feasible blended model for advanced surgical training, meeting both the need for specialty expertise and preparation for independent practice.

Table. HPB Fellowship Transition to Practice Experience.

	Year:		
	FY 2012	**FY 2013**	***FY 2014**
Total Operative Volume (major cases)	207	176	223
Independent cases, n (% of total)	61 (29.5%)	73 (41.4%)	88 (39.5%)
Most Common Independent Cases:			
Laparoscopic Cholecystectomy	50 (82.0%)	55 (75.3%)	43 (48.9%)
Elective Hernia Repair	1 (1.7%)	4 (5.5%)	34 (38.6%)
Partial/Total Gastric Resection	0 (0%)	5 (6.8%)	3 (3.4%)
HPB Cases as trainee, n (% of total)	146 (70.5%)	103 (58.6%)	135 (60.5%)
Defined Category Cases:			
Hepatic	24 (16.4%)	23 (22.3%)	31 (23.0%)
Pancreatic	43 (29.4%)	37 (35.9%)	35 (25.9%)
Biliary	24 (16.4%)	13 (12.6%)	16 (11.9%)
New Patient Consultations	97	87	152
RVUs Generated	1770	2153	3163
Total Charges Billed	$175,616	$452,776	$552,974

**This represents the first years' experience for the fellow completing training 2013-2015*

OP-I.09 STROKE VOLUME VARIATION (SVV) CONTINUOUS MONITORING FOR INTRAOPERATIVE INTRAVASCULAR FLUID MONITORING IN HPB SURGERY

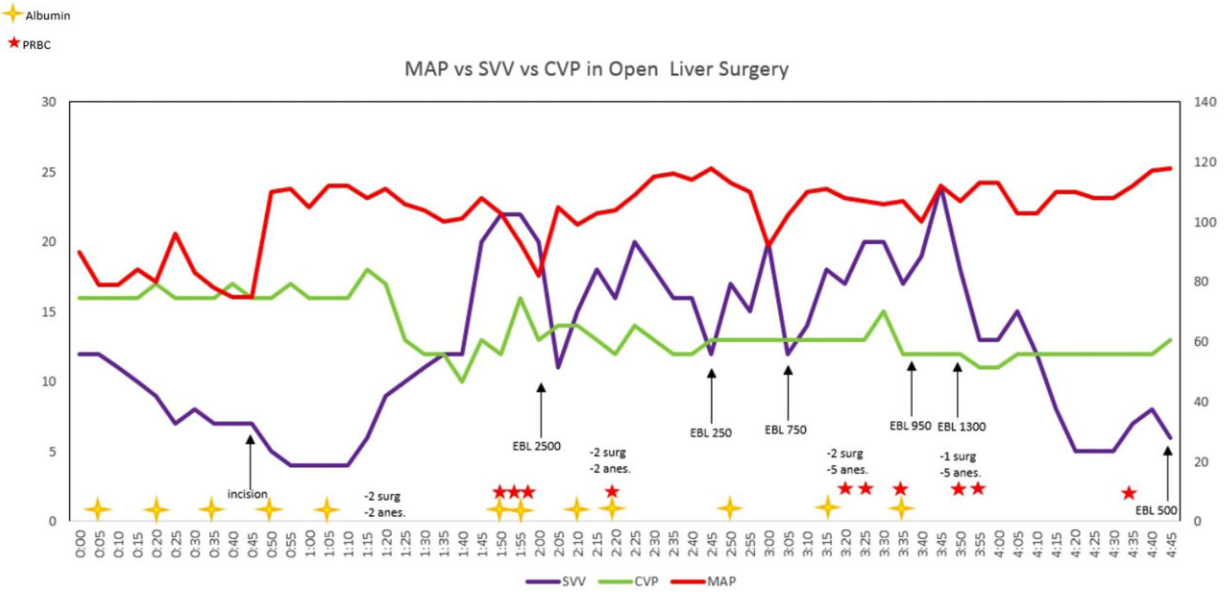
E. H. Baker, J. Drummond, A. Cochran, R. Seshadri, J. Martinie, D. Iannitti, R. Swan
Carolinas HealthCare System, Charlotte, NORTH CAROLINA

Introduction: Previous studies have demonstrated that stroke volume variation (SVV) represents a more accurate determinant of intravascular volume status and fluid responsiveness. This has been particularly true for patients who are intubated in which previously used measurements of intravascular status such as mean arterial pressure (MAP) or central venous pressure (CVP) may be misrepresentative.

Methods: Continuous intraoperative monitoring was performed for a consecutive series of patients who underwent laparoscopic and open liver and pancreas surgeries. Data points collected for analysis included SVV, MAP, CVP, stroke volume (SV), cardiac index (CI) every 5 minutes. Estimated blood loss (EBL), hemoglobin (Hgb), pH and surgeon and anesthesia estimates of patient volume status were determined every hour.

Results: 23 patients were enrolled and underwent continuous monitoring during the following procedures: 5 open liver, 6 laparoscopic liver, 6 open pancreas, 6 laparoscopic pancreas. A weak inverse relationship was seen between SVV and total fluid status in 14 out of 23 total cases (60.9%) as indicated by a negative linear regression slope. The correlations were low for all groups, with an average R^2 of 0.10 – or 10% of the variability in the model explained by the SVV and total fluid variables.

Conclusions: SVV correlates inversely with total fluid status and may be a used as a non-invasive tool in determining fluid status in HPB procedures. While the sample size was small, we plan on using the data to develop a standardized fluid management protocol for HPB surgeries and examine surgical outcomes compared to matched, retrospective cases.



OP-I.10 RECURRENCE PATTERN AND SURVIVAL IN PATIENTS UNDERGOING SIMULTANEOUS RESECTION FOR SYNCHRONOUS LIVER METASTASES FROM PRIMARY COLORECTAL CANCER : RETROSPECTIVE STUDY OF 286 PATIENTS FROM A SINGLE HIGH VOLUME HPB CENTRE

R. Kumar[1], S. Park[2]
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Background: The optimal combination of available therapies for patients with resectable synchronous liver metastases from colorectal cancer (SLMCC) is unknown, and the pattern of recurrence after simultaneous resection has been poorly investigated. In this study, the authors examined recurrence patterns and survival after simultaneous resection for SLMCC.

Methods: Consecutive patients with SLMRC who underwent complete simultaneous resection of both the rectal primary and liver metastases with curative intend between May 2001 and December 2010 were identified from a prospective database. Fifteen patients were excluded due to follow-up loss. Clinicopathological factors were retrospectively analyzed to investigate initial recurrence pattern affecting survival.

Results: In total, 286 patients underwent simultaneous resection of both primary colorectal cancer and liver metastases with curative intend. The 3, 5 and 10-years recurrence-free survival rate were 35.5%, 31.5% and 27.2%, respectively, for the entire cohort with a median follow-up of 60.8 months for survivors. 196 patients(68.5%) developed a recurrence. Most common site of the initial recurrence was liver(48.5%), followed by the lung (25%). Initial recurrence pattern correlated with survival ($P < 0.001$). Analysis demonstrated that a loco-regional recurrence was significant risk factor for survival.

Conclusions: Of the patients with SLMCC who developed recurrent disease, systemic sites were overwhelmingly more common than pelvic recurrences. The current results indicated that initial recurrence patterns in patients undergoing simultaneous resection with curative intent was important to predict survival, especially in patients with loco-regional recurrence. Also, simultaneous resection seems safe and feasible despite lack of evidence, provided an institution specific protocol is followed.

OP-I.11 IS THERE A ROLE FOR NEAR INFRARED SPECTOMETRY (NIRS) OXYMETRY DURING LIVER SURGERY?

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[1]Centre Hospitalier Universitaire de Montreal, Service de Chirurgie HBP, Montreal, QC; [2]Centre Hospitalier Universitaire De Montreal, Soins Intensifs, Montreal, QC; [3]Institut De Cardiologie De Montreal, Soins Intensifs, Montreal, QC

Introduction: Peri-operative cerebral and somatic oxymetry is used for monitoring during cardiac surgery, but it has never been used in liver surgery. Our goal was to define the place of NIRS oxymetry in liver resections.

Methods: 90 patients undergoing major hepatectomy were included (45 men and 45 women). Oxymetry was obtained by NIRS at 4 sites (cerebral right and left, arm and thigh) before and during surgery. Baseline oxymetry (*BaseO*) and desaturation (*Desat*) (Threshold = 80% baseline) values were compared to peri-operative data.

Results: Median ICU stay was 2d and median hospital stay (LOS) was 7d. Cerebral *BaseO* correlated significantly with duration of stay in the intensive care unit (ICU) stay ($p = 0.04$), in the hospital length of stay (LOS) ($p = 0.01$) and respiratory insufficiency ($p = 0.002$). Arm *BaseO* correlated with blood loss ($p = 0.05$), blood transfusion ($p = 0.03$), ICU stay ($p = 0.01$) and surgical complications ($p = 0.049$). Also, thigh *BaseO* correlated with surgical complications ($p = 0.0035$) and LOS ($p = 0.01$). Cerebral *Desat* did not correlate with any complication but thigh *Desat* did with blood loss ($p = 0.03$), LOS ($p = 0.05$) and surgical complications (0.0132). Arm *Desat* inversely correlated with Pringle duration ($p = 0.01$).

Conclusion: NIRS is a very simple approach for oxymetry evaluation during major liver surgery. Baseline and systemic values are correlated with some operative data and complications. These preliminary results should lead to a more extensive study to determine whether correction of impaired level of oxymetry will improve patients' outcome.

OP-I.12 USING THE CLINICAL RISK SCORE TO PREDICT WHICH PATIENTS WILL BENEFIT FROM PRE-OPERATIVE CHEMOTHERAPY FOR COLORECTAL LIVER METASTASES

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[1]London Health Sciences Centre, London, ONTARIO; [2]Western University, London, ONTARIO

Background: Pre-operative chemotherapy has become a mainstay in the treatment of colorectal liver metastases (CRLM) in patients with both resectable and unresectable disease. We aim to evaluate whether the Clinical Risk Score (CRS) can be used to predict patients with resectable disease who will benefit from metastectomy before chemotherapy.

Methods: All patients with CRLM who underwent 4 or more cycles of chemotherapy at our institution between 2000 and 2013 were retrospectively analyzed. Patients had to have cross-sectional computed tomography (CT) imaging before and after the treatment to meet inclusion criteria. Tumor response was determined using RECIST 1.1 criteria. The primary outcome was tumor progression, defined as RECIST 1.1 progressive disease. No progression was defined as RECIST 1.1 stable disease, complete response, or partial response. Multivariate regression was used to assess if the CRS, as well as its individual components, were predictive of disease progression.

Results: Seventy-seven patients were identified (mean follow-up of 2.19 ± 1.50 years). Twenty-seven patients had progressive disease (35.1%). On multivariate analysis, a lower CRS was predictive of disease progression on chemotherapy (OR = 0.370, $p = 0.018$). Furthermore, patients with

5 or more metastases (OR 0.122, p = 0.023), and increased size of the largest lesion (OR 0.647, p = 0.047) were less likely to progress.
Conclusion: Patients with more aggressive tumors, as reflected by a higher CRS, are less likely to have tumor progression on chemotherapy. Conversely, patients with low CRS are more likely to progress on chemotherapy, and therefore those with resectable disease upfront would benefit from metastectomy (without pre-operative chemotherapy).

OP-I.13 INTRAOPERATIVE RADIOFREQUENCY ABLATION VERSUS SURGICAL RESECTION IN SOLITARY SMALL HCC

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Faculty Of Medicine, Alexandria University, ALEXANDRIA, SELECT A STATE/PROVINCE

Background: Percutaneous radiofrequency ablation (RFA) is used for treatment of small HCC however surgeons are frequently using intraoperative RFA for tumors at locations difficult for the percutaneous procedure. The aim was to evaluate the results of intraoperative RFA for small HCCs (<2 cm) at locations difficult for percutaneous route.
Methods: 420 patients with small solitary HCC (<2 cm) were treated; 328 via percutaneous RFA while 92 patients presented at sites not amenable for percutaneous route. 48 out of 92 patients underwent surgical resection, while 44/92 patients underwent intraoperative RFA.
Results: The location and depth of the HCC from the liver capsule was the only significant factors in the choice of the surgeon between resection and RFA. RFA group acheived complete ablation rate of 100% compared to the surgery group, where all patients achieved R0 resection. Complication rate was comparable (p = 1.0). After a median follow-up of 46 months (range, 16–65 months), no tumors showed neither local progression nor local recurrence and no significant difference was observed between two groups as regards early recurrence and number of de novo lesions (p = 0.49). One-year and 3-year survival rates were 92% and 83%, respectively, in the resection group comparable to the corresponding rates of 91% and 76% in the RFA group (p = 0.8).
Conclusion: For small HCC in locations difficult for a percutaneous approach, intraoperative RFA can be an alternative option for deep seated tumors necessitating more than one segmentectomy achieving similar tumor control, overall and disease-free survival.

OP-I.14 HEALTH-RELATED QUALITY OF LIFE FOLLOWING TREATMENT OF NEUROENDOCRINE LIVER METASTASIS

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Johns Hopkins Hospital, Baltimore, MARYLAND

Background: A large subset of patients with neuroendocrine liver metastasis(NELM) is symptomatic at the time of presentation. In addition to improving survival, treatment of NELM seeks to provide palliation of symptoms. Data on health-related quality of life(QoL) are uncommon. We sought to define patient-reported QoL following treatment of NELM.
Methods: Patients who underwent treatment of NELM at Johns Hopkins Hospital between 1998–2013 and who were alive as of March 2014 were identified(n = 276). These patients were invited to complete a QOL survey designed using validated assessment tools.
Results: The response rate was 27.5%(n = 76); questionnaires were completed at a median of 49.1 months(range, 23.3–117.8) following initial treatment. Median patient age was 55 years and the majority was male(n = 43, 56.6%). Most patients had a pancreatic(n = 21, 27.6%) or a small bowel(n = 30, 39.5%) primary tumor; the overwhelming majority had multiple NELM(88.2%). Prior to the initiation of any therapy, 84.2% patients reported symptoms, with the most common symptoms being fatigue(78.9%), diarrhea(67.1%), and flushing(44.7%). Initial treatment of NELM consisted of resection ± ablation(64.5%) or intra-arterial therapy(IAT)(35.5%). Many patients reported overall improvement in physical health(41.4%) and mental health(34.3%). After treatment, the proportion of patients with severe symptoms decreased from 36.8% to 21.0%(P = 0.03); symptoms such as diarrhea and flushing improved at the end of the treatment course(both p < 0.05), whereas fatigue remained unchanged(p = 0.45).
Conclusions: Surgery and IAT management of NELM provides a reasonable improvement in patient-reported symptoms and QoL. Liver-directed therapies should be considered in those patients with symptomatic, high-volume disease even if complete treatment of the NELM is not feasible.

OP-I.15 IMAGING SURVEILLANCE OF HEPATOCELLULAR ADENOMAS

Y. Chun, R. Parker, S. Reddy, E. Ehrenwald, M. Hill, S. Inampudi, T. Sielaff
Virginia Piper Cancer Institute, Minneapolis, MN

Background: A consensus surveillance protocol is lacking for patients with hepatocellular adenomas.
Methods: Patients with hypervascular hepatic lesions ≤5 cm that did not meet criteria for focal nodular hyperplasia or hepatocellular carcinoma were entered into a surveillance schedule with contrast-enhanced MRI 6, 12, and 24 months after baseline imaging. Patients with risk factors, including male gender and active oral contraceptive pill (OCP) use, were excluded. If lesions remained stable or decreased in size, then surveillance imaging was discontinued.
Results: Between 2011–2014, 109 consecutive patients with benign hypervascular lesions were evaluated at our multidisciplinary liver conference. Median follow-up from date of diagnosis was 24 months (range, 0–168 months). By imaging criteria or biopsy, 37 patients were diagnosed with focal nodular hyperplasia, and 44 patients with hepatocellular adenoma, including 18 with adenomatosis. Twenty-eight patients had indeterminate lesions. Clinically significant hemorrhage +/– rupture occurred in 6 patients without prior imaging and 2 patients with known hypervascular hepatic lesions. All patients who suffered hemorrhage had adenomas >5 cm and other risk factors, including OCP use (n = 7) and anticoagulation (n = 1). In 43 patients eligible for our

surveillance schedule, all lesions remained stable or decreased in size, and no patient developed complications.

Conclusions: Patients with hepatocellular adenomas without risk factors, such as size >5 cm or OCP use, can safely be observed with serial imaging 6, 12, and 24 months after initial diagnosis. If lesions remain stable or decrease in size, then longer-term surveillance is unlikely to identify patients at risk for complications.

OP-I.17 NATIONAL TRENDS WITH LAPAROSCOPIC LIVER RESECTION: RESULTS FROM A POPULATION-BASED ANALYSIS

J. He, N. Amini, G. Spolverato, K. Hirose, M. A. Makary, C. L. Wolfgang, M. J. Weiss, T. M. Pawlik
The Johns Hopkins Hospital, Baltimore, MD

Background: Interest in laparoscopic liver resection (LLR) has grown since the International "Louisville Statement" was published in 2009. However, limited population-based data on LLR utilization patterns and outcomes are available.

Methods: LLR data from the Nationwide Inpatient Sample (NIS, 2000–2012) and the National Surgical Quality Improvement Project (NSQIP, 2005–2012) were divided into 2 cohorts, before and after the Louisville Statement. Patient demographics, indications, trends in LLR utilization, and perioperative outcomes were compared before and after the 2009.

Results: Patients undergoing open versus LLR were comparable with regard to age, sex, and comorbidity status (Table). 1,131 and 642 LLR were identified from NIS and NSQIP, respectively. The majority of patients underwent LLR for a malignant indication (NIS: primary malignancy, 29.9% vs. metastasis, 43.2%; NSQIP: primary malignancy, 25.7% vs. metastasis, 42.2%). The mean annual volume of LLR increased from 2000–2008 vs. 2009–2012 (NIS: 63 vs. 168; NSQIP: 52 vs. 127; both $P < 0.01$). The perioperative mortality associated with LLR was low (NIS: 2.8% vs. NSQIP: 0.9%), while the morbidity was higher (NIS: 38.1% vs. NSQIP: 30.7%); mortality and morbidity did not change over time (both $P > 0.05$). Since 2009, LLR was associated with a shorter length of stay (NIS: 5 vs. 6 days, $P < 0.01$) and more likely to be performed in teaching hospitals (NIS: 93% vs. 87%, $P = 0.02$).

Conclusions: Since the Louisville Statement in 2009, utilization of LLR has increased. LLR appears to be safe with low mortality and reasonable morbidity, as well as be associated with a modest decrease in LOS.

	NIS (n, %)		NSQIP (n, %)	
	Open (n=31,084)	LLR (n=1,131)	Open (n=12,585)	LLR (n=642)
Age, yrs (median)	57(47-68)	61(50-71)	60(50-68)	62(53-70)
White race	18,375(72.0)	692(75.7)	8,956(74.8)	472(76.0)
Male sex	15,013(48.4)	549(48.5)	6,092(48.5)	320(49.9)
Comorbidities ≥ 3	640(2.1)	18(2.9)	1,189(9.5)	65(10.1)
Type of resection				
Partial Hepatectomy	19,804(63.7)	838(74.1)	7,602(60.4)	398(62.0)
Hemi/total Hepatectomy	11,280(36.3)	293(25.9)	4,983(39.6)	244(38.0)
Elective procedure	19,047(78.7)	697(86.3)	12,451(98.9)	65(10.1)
Urban Hospital	27,756(97.7)	903(99.1)	-	-
Teaching Hospital	22,174(84.1)	811(89.0)	-	-
LOS (median, IQR)	7(5-10)	6(4-8)	6(4-8)	6(4-8)
Any complication	13,872(44.6)	431(38.1)	4,030(32.0)	197(30.7)
Inpatient Mortality	1,648(5.3)	32(2.8)	276(2.2)	4(0.9)
Time Period				
2009 or before	21,715(69.9)	627(55.4)	5.445(43.3)	261(40.6)
2010 or after	9,369(30.1)	504(44.6)	7,140(56.7)	381(59.4)

OP-I.18 POST-HEPATECTOMY HYPERBILIRUBINEMIA: THE POINT OF NO RETURN

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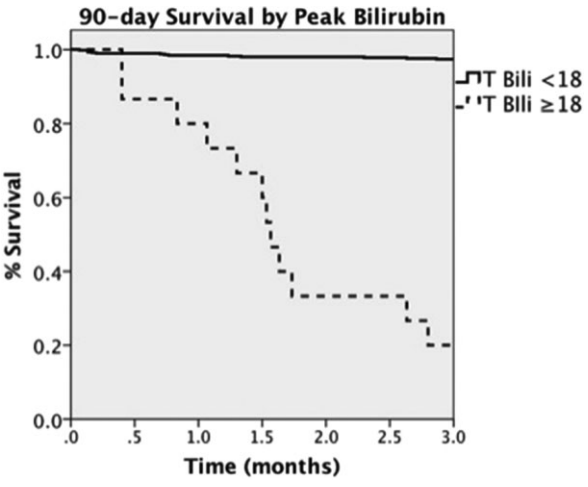
Background: Post-hepatectomy hyperbilirubinemia is associated with liver insufficiency and failure. The threshold of the highest survivable total bilirubin (tbili) is not defined. Our aim was to identify the peak postoperative tbili beyond which is survival is improbable.

Methods: An institutional database of patients undergoing major hepatectomy (≥3 segments), excluding biliary resections, from 2000–2012 was reviewed. A peak bilirubin of ≥18 mg/dL in the first 45 days post op was associated with increasing 90-day mortality (90DM). Clinicopathologic factors were assessed for association with 90DM. We also examined predictors of elevated postoperative tbili.

Results: 607 patients were identified with a 90DM of 4.4%. 90DM for a peak tbili ≥18 (n = 16) was 81%, compared to 2.4% for a bilirubin <18 mg/dL (graph). All patients with a tbili ≥30 died (n = 7). On multivariate analysis (MVA) for 90DM, post-operative tbili ≥18 (HR 24, CI 3.3–174;p = 0.002), post-operative FFP (HR 4.8, CI 1.1–20.2;p = 0.034), and cirrhosis (HR 5.9, CI 1.1–31.3;p = 0.038) were significant predictors. Furthermore, predictors of tbili ≥18 identified on MVA included: older age (HR 1.1, CI 1.0–1.2; p = 0.001) and postoperative FFP (HR 10.1, CI 2.5–40.8; p = 0.001).

Conclusion: Total bilirubin ≥18 is significantly associated with an increase in 90-day mortality after major hepatectomy; there are no survivors for patients whose tbili rises ≥30.This information can help clinicians advise patients and families who experience posthepatectomy hyperbilirubinemia; as well, it may be an important marker for intervention as supportive therapies improve.



OP-I.19 EARLY AND LONG-TERM SURVIVAL OUTCOMES OF PATIENTS WITH COLORECTAL LIVER METASTASES RESECTED AFTER CONVERSION CHEMOTHERAPY

M. C. Marques, H. S. Ribeiro, R. S. De Souza, W. L. Da Costa, A. L. Diniz, A. L. De Godoy, I. C. De Farias, C. A. De Mello, F. A. Soares, M. A. Almeida, F. J. Coimbra
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Liver resection is the standard of care for patients with colorectal liver metastases, but only 15% to 25% are resectable at the initial diagnosis. Improvements in chemotherapy response rates and surgical technique expanded the resectability criteria for patients initially considered as having unresectable disease. These patients have an intermediate prognosis between those who were upfront resectable and those who did not achieve resectability. The aim of this study was to analyze survival outcomes and determine clinicopathological prognostic factors in this scenario. Patients who underwent liver resection for colorectal liver metastases after conversion therapy between 1998 and 2013 were retrospectively analyzed. Unresectability was defined according to the Consensus Guidelines recently published. In the study period, 352 liver resections for colorectal metastases were performed in 268 patients. Fifty-one patients met the inclusion criteria and were analyzed. Thirty and 90-day mortality rate was 5.8% and 9.8%. Major morbidity rate was 29.4% according to Clavien-Dindo Classification. Median number of chemotherapy cycles before hepatectomy was 12. With a median follow-up of 36 months, the 3-year overall survival was 66.1% versus 76.4% in the resectable group ($p = 0.060$) and 3-year disease-free survival was 10.4% versus 35.8% ($p < 0.001$). In multivariate analyses, factors that influenced overall survival were the occurrence of Class III and IV postoperative complications and more than 4 liver nodules. There was no independent predictor of disease free survival on multivariate analyses. Liver resection after conversion therapy for colorectal liver metastases is a procedure with high morbimortality but also associated with long-term survival in selected patients.

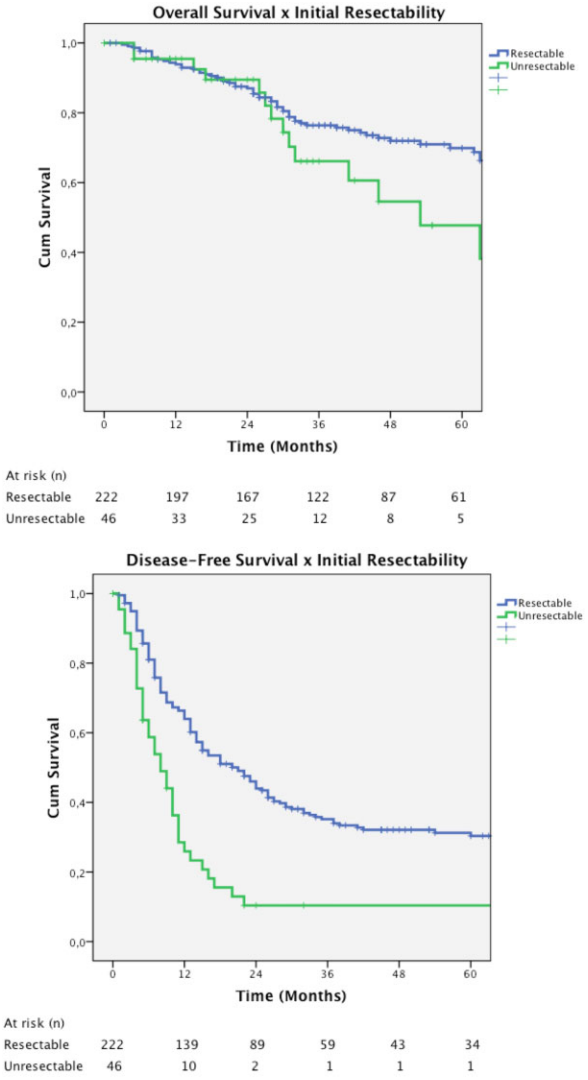

Chart of overall (left) and disease-free survival (right) comparing initially resectable with unresectable colorectal liver metastases.

OP-I.20 RESECTED INTRAHEPATIC CHOLANGIOCARCINOMA: PATTERNS OF ADJUVANT THERAPY AND RECURRENCE

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Background: The majority of patients who undergo liver resection for intrahepatic cholangiocarcinoma (ICC) suffer from recurrence and succumb to their disease. The role of adjuvant treatment remains unknown.

Methods: Clinicopathologic data of resected ICC between 1/2000–12/2013 were evaluated. Patterns of adjuvant therapy and recurrence were analyzed.

Results: Of the 76 patients who underwent resection of a ICC the median age was 65 years and 54% were female. The majority of patients (72%) underwent a major hepatectomy

with 87% being an R0 resection. Median ICC size was 5.5 cm. Excluding patients who died within 60 days or were lost to follow-up, 44%(30/68) did not receive adjuvant treatment (median overall survival (OS)not reached), 34%(23/68) received adjuvant therapy within 3 months (OS: 48 months), and an additional 22%(15/68) received therapy after the first recurrence (OS: 44 months). Adjuvant chemotherapy was more likely to be given to patients with an R1 resection (26%vs7%;p = 0.05) and nodal disease (35%vs11%;p = 0.02). Gemcitabine based regimens were the most common first line (85%) (gemcitabine: 32%, gemcitabine/cisplatin: 36%, gemcitabine/oxaliplatin: 32%); 5 FU/chemoradiation was first line in 15%. After median follow-up of 25 months 41% remained free of disease(NED), 12% had a single liver recurrence, 13% multinodular liver recurrence and 34% extrahepatic recurrence. Of the patients who recurred single liver recurrences had the best median survival compared to multinodular recurrences and distant disease (73 vs 23 vs 37 months respectively;p = 0.09).

Conclusions: The majority of patients undergoing resection for an ICC either do not receive adjuvant treatment or they receive it after recurrence of their tumor. Single nodule hepatic recurrences have the best outcome.

OP-I.21 **ROLE OF LIVER RESECTION OR ABLATION IN METASTATIC MELANOMA MANAGEMENT**

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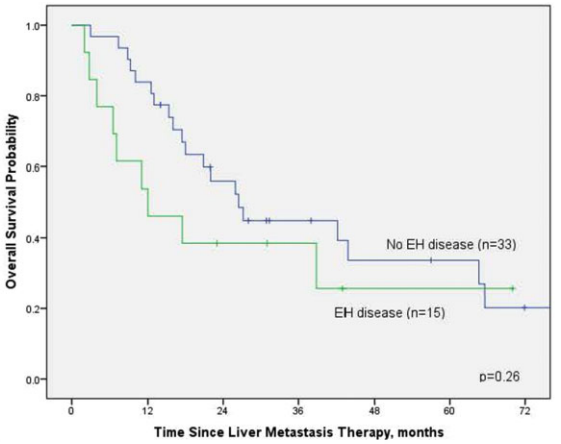
Introduction: The median survival for patients with metastatic melanoma is usually limited to approximately one year. Liver ablation and metastasectomy are associated with improved survival in well-selected patients, but their role in era of more effective systemic therapies is uncertain.

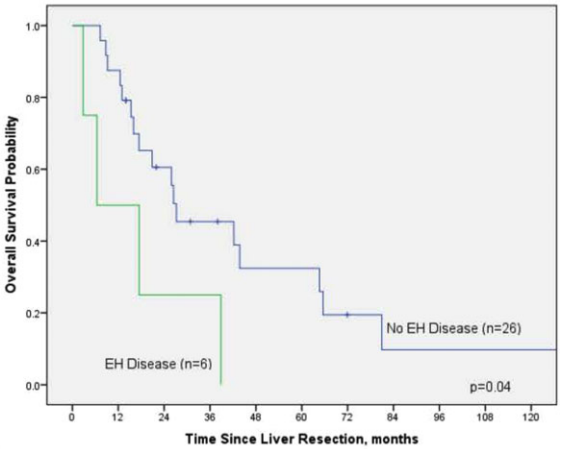
Methods: Patients undergoing liver ablation or resection for melanoma liver metastases between 1993 and 2013 were included. Outcomes and prognostic factors such as medical therapy impact were evaluated.

Results: Forty eight patients underwent ablation (n = 16) or resection (n = 32) for metastases from cutaneous (n = 26) or ocular (n = 22) origin. Median overall survival (OS) was 26 months, with 12 patients (27.3%) alive at 3 years, after resection (n = 9) and after ablation (n = 3) respectively. Patients in the ablation group harbored more aggressive disease at time of presentation, with more extrahepatic disease (EHD) (p = 0.008) and a shorter disease-free interval between primary tumor and liver metastasis diagnosis (p = 0.01). In addition, 68.8% of patients received preoperative systemic therapy before ablation. Median OS in ablation (18 months) and resection (27 months) groups was not different (p = 0.9). EHD was a poor prognostic factor for OS in the resection group (p < 0.05; see Figure). In patients with EHD, 78% of patients receiving preoperative therapy before ablation experienced partial response and tended to have longer OS (12 months) compared to resected patients (6 months, p = 0.2).

Conclusion: Liver resection should be considered only in selected patients with melanoma liver metastases without EHD which is associated with poor outcomes. When EHD is controlled with systemic therapy, indication for combined liver ablation needs further investigations.



A



B

Impact of extrahepatic (EH) disease on overall survival in the whole cohort (A, n=48) and in the resection group (B, n=32).

OP-I.22 **RADIOFREQUENCY-ASSISTED LIVER PARTITION AND PORTAL VEIN LIGATION (RALPP): COMPARATIVE SERIES OF A MODIFIED ALPPS TECHNIQUE FOR TWO-STAGE LIVER RESECTION**

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Background: The introduction of portal vein embolization and recently the ALPPS technique has rendered a greater proportion of liver tumours surgically resectable by increasing the volume of future liver remnant (FLR) in selected patients. The RALPP technique involves a laparoscopic first stage portal vein ligation and *in situ* liver splitting using ablation only without complete transection. We hypothesise that this will rapidly increase the size of the FLR limiting any associated morbidity from liver transection.

Methods: Consecutive patients who underwent RALPP were compared to an age-sex- and liver function-matched cohort of patients undergoing PVE prior to right hepatectomy. The primary endpoint was the percentage increase in FLR volume. Secondary endpoints were morbidity, mortality, and postoperative liver function.
Results: There were 12 patients (6M : 6F) in the RALPP group and 8 (4M : 4F) in the PVE group with a median age of 62.5 and 65 yrs respectively. The mean % increase in the FLR volume was 61.5 +/– 16.3 measured after a mean of 20.8 +/– 7.3 days following the first stage for RALPP compared to a % increase of 16.46 +/– 11.7 ($p = 0.001$) after 52.3 +/– 14.8 days ($p < 0.001$) following PVE. There was one mortality in the RALPP group at day 19 following right hepatectomy from bowel ischaemia and liver failure. There was no difference in morbidity or post-operative liver function.
Conclusion: The RALPP technique is feasible and safe in this limited series, with a greater increase in FLR volume in a shorter time period compared to PVE.

OP-I.23 TEMPORAL TRENDS IN SURGICAL RESECTION AND PERI-OPERATIVE CHEMOTHERAPY FOR COLORECTAL CANCER LIVER METASTASES (CRCLM) IN ROUTINE CLINICAL PRACTICE

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Background: The treatment of CRCLM continues to change over time. We report trends in management and outcome of all patients with resected CRCLM in Ontario, Canada.
Methods: All cases of CRC in Ontario who underwent surgical resection of liver metastases in 2002–2009 were identified using the population-based Ontario Cancer Registry. Electronic records of treatment and pathology reports were linked to the registry to identify utilization of neoadjuvant (NACT) and adjuvant chemotherapy (ACT) and describe surgical management and pathologic findings. We describe differences over 2 study periods: 2002–2005 and 2006–2009.
Results: During 2002–2009, 1711 patients underwent resection of CRCLM. Mean age was 63 years. During the study period there was a 60% increase in patients undergoing resection of CRCLM. For the 2 study periods, mean number of liver lesions resected was 2.0 and 2.2 ($p = 0.051$), mean size of largest lesion was 4.5 cm and 4.0 cm ($p = 0.003$), major hepatic resection (≥3 Couinaud segments) rate was 66% and 63% ($p = 0.264$) and R1 resection margin rate was 6% and 9% ($p = 0.021$), respectively. 90-day mortality rates for the study periods were 4% and 3% ($p = 0.499$). Use of NACT and ACT increased from 19% to 41% ($p < 0.001$) and 42% to 50% ($p < 0.001$) between study periods, respectively. Five year overall survival during the 2 study periods was 43% (95%CI 40–47) and 45% (95%CI 42–48) ($p = 0.402$).
Conclusions: Resection of CRCLM and the use of peri-operative chemotherapy increased during the study period. Survival outcomes among patients treated in routine clinical practice are comparable to institution-based studies.

OP-I.24 PATIENTS WITH HEPATITIS B PRESENT WITH MORE ADVANCED LIVER CANCER THAN PATIENTS WITH HEPATITIS C

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Background: Well-described factors affecting the incidence of Hepatocellular Carcinoma (HCC) include gender, age, and etiology of liver disease. Factors that may affect the stage of HCC at presentation are poorly understood. Stage at presentation, however, largely dictates available treatments and ultimately prognosis for patients.
Aims: Using a large cohort of patients with HCC, identify elements that correlate with HCC stage at initial BCLC stage.
Methods: This is a two-institution retrospective review of patients with pathologically or radiographically confirmed HCC from January 1991–August 2014.
Results: There were 1134 patients (835 men and 299 women) with HCC in this study. MELD scores ranged from 6–38. Higher MELD scores correlated with higher stages of HCC ($p = .01$). Screening was found to correlate with a lower BCLC stage ($p = .001$). Additionally, patients with HBV presented at higher stages ($p = 0.03$) compared to patients with HCV who presented at lower stages ($p = .001$). Thirty-three percent of patients with HCV were screened, and 19% of HBV patients were screened. There was no difference in mean MELD score in HCV vs HBV patients. (10.8 vs 10.3, $p = 0.10$) Mean tumor size for HCV was 4.4 cm compared to 6.7 cm in HBV ($p = 0.001$).
Conclusions: Despite similar MELD scores between patients with HCV and HBV, patients with HBV infection presented with higher stages of HCC and larger tumors. It is unclear if this is biologically driven or is related to a screening disparity between the two groups.

OP-I.25 IMPACT OF POSTOPERATIVE MORBIDITY AND LIVER FAILURE ON SURVIVAL OF PATIENTS WITH RESECTED COLORECTAL LIVER METASTASES

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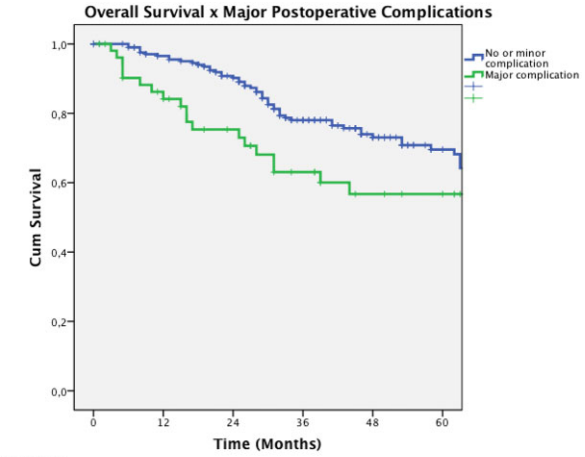
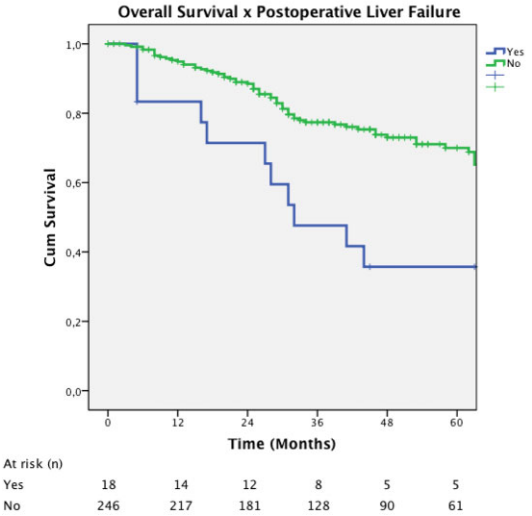
Liver resection has become the best chance of cure for patients with colorectal liver metastases. However, studies have shown that postoperative complications could compromise long-term survival results. The aim of this study was to determine the incidence and prognostic factors for postop-

erative morbidity, including liver failure, and their impact on long-term survival. Patients who underwent liver resection for colorectal liver metastases between 1998 and 2012 were analyzed. Any deviation from usual postoperative early outcome was recorded as complications and stratified according to the Clavien-Dindo classification. Three hundred forty-six liver resections were performed in 285 patients. Postoperative morbidity occurred in 57.8% of operations and 90-day mortality was 3.4%. Major complications (grade 3 and 4) occurred in 21.1% of hepatectomies. Twenty-three (6.6%) patients had postoperative liver failure. After a median follow-up period of 37.5 months, patients who had major postoperative complications and/or postoperative liver failure had statistically significant worse 3-year overall survival. In multivariate analyses, both factors were independent predictors of survival (Major postoperative complications HR = 2.1, $p = 0.004$, 95% CI 1.2–3.7; postoperative liver failure HR = 1.9, p = 0.046, 95% IC 1.0–3.8). However, these factors had no impact on disease free survival. These findings may be explained by a decrease in life expectancy observed in patients who experience life-threatening events. Detailed clinical preoperative evaluation, careful surgical techniques and meticulous postoperative care may improve long-term survival results.





OP-I.26 GADOXETIC ACID (GA) RELATIVE LIVER ENHANCEMENT (RLE) ON PREOPERATIVE MAGNETIC RESONANCE IMAGING (MRI) AS A MARKER OF LIVER FUNCTION TO PREDICT THE RISK OF POST-HEPATECTOMY LIVER FAILURE (PHLF)

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Preoperative liver function and future liver remnant (FLR) are typically used to predict the risk of PHLF. The hepatic physiologic reserve and ability to hypertrophy are difficult to predict. We investigated the use of contrast-enhanced MRI with GA as a marker for liver function and potential predictor of PHLF. We retrospectively analyzed all consecutive patients who underwent major liver resection (≥3 segments) and preoperative MRI-GA at our institution between October 2010 and December 2013. Mean RLE was calculated based on regions of interest drawn of the liver on the unenhanced and hepatobiliary phases. The associations between mean RLE and PHLF according to the 50-50 and ISGLS criterias were tested with univariate and multivariate logistic regression analysis. 68 patients (44 men; median age 60.5 years) fulfilled the inclusion criterias: 47 CRLM, 14 HCC, 2 intrahepatic cholangiocarcinoma, 2 NETLM and 3 benign diseases. 1 patient had PHLF according to the 50-50 criteria and 13 patients had PHLF according to the ISGLS criterias (4 grade A, 8 grade B, 1 grade C and death). Mean RLE correlated with the presence and stage of fibrosis on histology (p = 0,032 and p = 0,045). In logistic regression analysis, mean RLE with a cut-off of 100%, in combination with FLR, increased the ability to predict the presence of PHLF according to the ISGLS criteria. However, it did not reach statistical significance as an independent predictor. MRI-GA and mean RLE, in addition to FLR, can improve risk assessment for PHLF after major liver resection.

OP-I.27 THE LEARNING CURVE EFFECT IN LAPAROSCOPIC LIVER RESECTION

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Background: The expansion of laparoscopic liver resection (LLR) has been considerably slower compared to that of other laparoscopic procedures. In this study we analyzed the learning curve associated with LLR.

Method: Retrospective database analysis of consecutive LLR performed between 3/07–6/14. Procedures were divided in three chronological groups: A (03/07–05/11, 43 pts), B (05/11–05/13, 43 pts), C (05/13–06/14, 42 pts).

Results: The three groups were comparable for patients' median age (57 yo; 59 yo; 59 yo), gender (25.6, 39.5, 45.2,%

male), percentage of patients who had a resection for a malignancy (86.0%, 83.7%, 65.6%), and median operative time (182 min, 190 min, 197 min). Complex procedures (defined as: trisegmentectomies, left hepatectomies, right hepatectomies or central hepatectomies) increased significantly over time ($P = 0.007$). One 90-day mortality occurred in group A, while mortality in groups B and C was zero. There was an improving trend in estimated blood loss (568.5, 563.9, 342.0 ml), in number of patients transfused (4, 3, 2 patients), conversion to open procedures (4, 2, 1 conversions), number of complications (8, 3, 4 complications, Clavien grade III or higher). Median length of stay was significantly reduced in groups B and C (6.4 days, 3.8 days, 3.8 days; $P = 0.006$).

Conclusions: Similar to other surgical procedures, LLR is subject to a learning curve. Despite an increase in surgical complexity, after the first 43 procedures there was an improvement in blood loss, rate of conversion, morbidity, and length of stay.

OP-I.28 SAFETY AND EFFICACY OF A NEW ARTICULATING BIPOLAR ENERGY DEVICE FOR PARENCHYMAL TRANSECTION IN LAPAROSCOPIC LIVER RESECTION

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Background: The aim of this study is to assess the safety and efficacy of a new articulating vessel sealer (VS) for laparoscopic liver resection (LLR).

Methods: A new 5 cm, bipolar VS was used in 28 LLRs (group 1). A comparison was made to 28 patients who underwent LLR (group 2) using other energy devices. T-test and Chi square were used for statistics.

Results: Tumor type was malignant in 71% of patients in group 1 and 89% of the patients in group 2 ($p = 0.360$). Number and size of tumors, and resection type were similar in both groups. In group 1, less number of adjunctive devices (i.e. energy, clip appliers, staplers) were used (median 2) versus group 2 (median 3, $p = 0.032$). Staplers were used in 28% ($n = 8$) of cases in group 1 and 54% ($n = 15$) in group 2, with fewer number of cartridges fired in group 1, when used (median 1.5 vs 4, respectively, $p = 0.005$). Parenchymal transection time (28.2 ± 3.5 minutes vs 55.2 ± 4.1, respectively, $p < 0.001$) and total operative time (200.1 ± 13.7 vs 242.7 ± 14.4, respectively, $p = 0.036$) were shorter for group 1. Morbidity was 11% ($n = 3$) in group 1 and 18% ($n = 5$) in group 2 ($p = NS$). Intraoperative costs were an average of $ 3000 less in group 1 versus group 2 ($p = 0.0029$).

Conclusion: This study demonstrates the safety and efficacy of a new energy device for LLR. The data suggests a potential benefit of this device to reduce operative time and decrease costs by facilitating parenchymal transection.

OP-I.30 TREATMENT OF RECURRENCE AFTER RESECTION OF HEPATOCELLULAR CARCINOMA IN CIRRHOTIC LIVER

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Background: High recurrence rates after liver resection for hepatocellular carcinoma (HCC) remain problematic and no consensus exists on the optimal management of recurrence.

Methods: A retrospective analysis was performed on cirrhotic patients with resected HCC in our center between 1992 and 2013. Survival and recurrence outcomes were analyzed.

Results: Ninety-four patients with Child A (90 patients; 95.7%) or B (4 patients; 4.3%) cirrhosis were included. There were 79 males with a mean age of 60.8 ± 11.2 years. Major hepatectomy was performed in 43 patients (45.7%). Median HCC size was 3.5 cm (0.8–16.0 cm) and 79 patients (84.0%) had a single tumor. Forty-three patients (45.7%) experienced recurrent disease, mostly intrahepatic (36 patients; 83.7%). Overall and disease-free survivals were 70.0% and 48.4% at 3 years, and 61.6% and 41.6% at 5 years. Inferior overall and disease-free survivals were significantly associated with positive margins ($p = 0.005$ and $p < 0.001$), multiple tumors ($p = 0.018$ and $p = 0.03$), and multinodularity ($p = 0.007$ and $p < 0.001$). Age (<65 years; $p = 0.03$), tumor size (<3 cm; $p = 0.02$) and lower T stage ($p = 0.02$) were linked with longer overall survival. Invasion of adjacent organs ($p < 0.001$) and major vascular structures ($p = 0.01$) were associated with recurrence. Thirty-three patients with recurrent HCC received treatment, which included chemotherapy (13 patients), chemoembolization (12), radiofrequency (8), alcoholization (3), repeat resection (4), or transplantation (3). Overall survival was significantly superior in patients with treated recurrence ($p = 0.005$).

Conclusions: Recurrence is frequent after HCC resection, particularly in patients with invasion of adjacent organs or vascular structures. However, satisfactory 5-year survival rates are achievable in patients with treated recurrent disease.

OP-I.31 MULTIMODAL TREATMENT OF UNRESECTABLE HEPATOCELLULAR CARCINOMA TO ACHIEVE COMPLETE RESPONSE RESULTS IN IMPROVED SURVIVAL

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Introduction: With technological advances, questions arise regarding how to best fit newer treatment modalities, such as transarterial therapies, into the treatment algorithm for patients with hepatocellular carcinoma (HCC).

Methods: Between 2005–2011, 128 consecutive patients initially treated with transarterial radioembolization or chemoembolization using drug-eluting beads were identified. Response was graded retrospectively. Toxicity was measured at 1,3, and 6 months after first and last treatments by recording biochemical adverse events in bilirubin, albumin, and INR.

Results: 53% of the patients were considered to have advanced stage disease (BCLC stage C). 16% of patients had an initial complete response, but with additional treatments, this was increased to 36%. Patients with a complete response as their best response to treatment had a median survival (95% confidence interval) of 5.77 (2.58, the upper limit has not yet been reached) years, significantly longer than those whose best response was a partial response, 1.22 (0.84, 2.06) years and those with stable disease as their best response, 0.34 (0.29, 0.67) years. Repeated treatments did not increase the risk of toxicity.

Discussion: This retrospective review of patients treated for intermediate and advanced stage HCC revealed a significant survival advantage in patients who achieved a complete response. We did not demonstrate superiority of one modality over the other, but did show that the two could be used sequentially without accumulating significant toxicity. These data support use of a multi-modality approach to intermediate and advanced stage HCC, combining liver-directed treatments as necessary to achieve a complete response.

Table 1: Multivariate Cox Regression Analysis of Factors Associated with Survival.

	Hazard Ratio (95% confidence interval)	p-value
Ascites	2.21 (1.10, 4.47)	0.02
Albumin	0.37 (0.22, 0.64)	<0.01
BCLC (C or D)	4.11 (2.11, 8.01)	<0.01
Largest Lesion Size > 5cm (including diffuse)	2.48 (1.31, 4.67)	<0.01
TACE/DEB vs. Y90	0.66 (0.37, 1.17)	0.11
Y90+TACE/DEB vs. Y90	1.09 (0.44, 2.66)	0.86
Number of Treatments	0.73 (0.52, 1.04)	0.08
Progressive Disease vs. Complete Response	7.62 (2.21, 26.3)	<0.01
Stable Disease vs. Complete Response	5.33 (1.42, 20.0)	0.01
Partial Response vs. Complete Response	3.66 (1.01, 13.3)	0.05

OP-I.32 HEPATIC RESECTION FOR DISAPPEARING LIVER METASTASIS: A COST-UTILITY ANALYSIS

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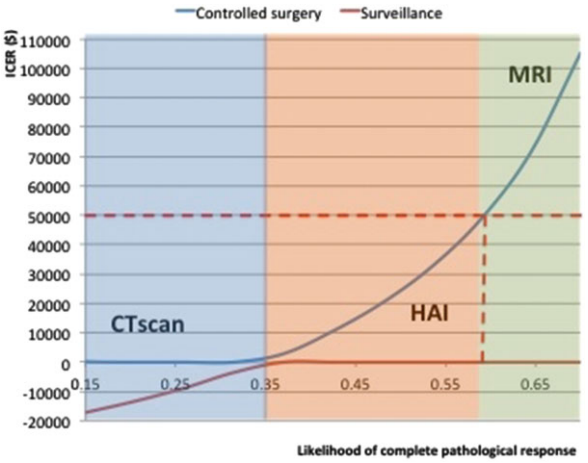
Introduction: Data on cost-effectiveness and efficacy of hepatic resection(HR) for colorectal liver metastasis that disappear after systemic chemotherapy(sCT) are lacking. We estimated the cost-effectiveness of HR plus 6 months of sCT in case of recurrence(strategy A) relative to surveillance and 6 months of sCT in case of recurrence(strategy B) for patients with colorectal disappearing liver metastasis(DLM).

Methods: Through a Markov model three base cases were evaluated involving a 65 year-old patient with three lesions in the right hemi-liver who underwent 6 months of sCT and 1)had DLM based on MRI; 2)had DLM based on CT scan; 3)had also hepatic artery infusion(HAI) with subsequent DLM based on CT scan.

Results: The NHB of strategy A(HR) versus strategy B(surveillance) was negative(-1.7 QALMs) for base case 1. In contrast, the NHB of HR was positive in base case 2(5.4 QALMs); the NHB of HR was positive for base case 3, but the effect was much more modest(0.15 QALMs). The ICER of strategy A versus B was highest for base case 1($105,216/QALY) and lowest for base case 2($-18,768/QALY); the ICER for HR versus surveillance was intermediate for base case 3($48,924/QALY). Sensitivity analyses demonstrated that HR was cost effective when compared with surveillance when the rate of complete pathological response after 6 months of sCT was estimated to be <60%.

Conclusion: Surveillance of DLM is an acceptable strategy when the diagnosis of DLM is made through MRI. NHB and ICER favor HR when the presence of DLM is determined by CT scan alone.



OP-I.33 SIMULTANEOUS RESECTION OF PRIMARY COLORECTAL CANCER AND SYNCHRONOUS LIVER METASTASES: A POPULATION-BASED STUDY

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Background: The role of combined resection of primary colorectal cancer (CRC) and synchronous liver metastases (LM) is gaining interest. Here we describe management and

outcomes of patients in the general population managed with simultaneous or staged resection of the primary tumor and synchronous CRC LM.

Methods: All cases of CRC in Ontario who underwent surgical resection of LM in 2002–2009 were identified using the population-based Ontario Cancer Registry. Synchronous disease was defined as having resection of CRC LM within 12 weeks of surgery for the primary tumor. Pathology reports were reviewed to identify extent of disease and surgery.

Results: During 2002–2009, 1711 patients underwent resection of CRC LM; pathology reports were identified for 1252 cases. 283 patients had synchronous disease; 116 (41%) patients had simultaneous resections and 167 (59%) had a staged resection. For the simultaneous and the staged groups, mean number of liver lesions resected was 1.7 and 2.3 ($p < 0.001$), mean size of the largest lesion was 3.1 and 4.7 cm ($p < 0.001$), major hepatic resection (≥3 Couinaud segments) rate was 26% and 76% ($p < 0.001$) and the R1 resection margin rate was 10% and 8% ($p = 0.46$), respectively. 30- and 90-day post-operative mortality rates for simultaneous and staged groups were 0.9% and 2.4% ($p = 0.65$) and 3.5% and 4.2% ($p = 1.00$), respectively.

Conclusions: Simultaneous resection of synchronous CRC LM is common in routine clinical practice. Compared to a staged approach, patients undergoing simultaneous resections had fewer and smaller liver metastases, less aggressive resections and comparable post-operative mortality.

OP-I.34 COMPARATIVE ANALYSIS OF LAPAROSCOPIC RESECTIONS OF POSTEROSUPERIOR SEGMENTS IN SEMIPRONE POSITION VS. LAPAROSCOPIC LEFT LATERAL SECTIONECTOMY IN SUPINE POSITION. DO WE NEED TO REDEFINE THE DEFINITION OF A MAJOR LAPAROSCOPIC LIVER RESECTION?

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Introduction: The Louisville-statement defined laparoscopic resections of posterosuperior segments (LPSS) as major hepatectomies. It has been shown that LPSS, are associated with a good field of view,lower conversion rate and less blood loss when performed in semiprone position. All patients whom underwent LPSS at our center were positioned in semiprone since August 2011. The aims of this study were to assess differences in perioperative outcomes between laparoscopic left lateral sectionectomies (LLLS) performed in supine position and LPSS in semiprone.

Methods: We reviewed a prospectively collected single-center database of all liver resections performed between August 2011 and August 2014. LLLS and LPSS were compared with respect to demographics and perioperative outcomes.

Results: Thirty nine patients underwent LLLS(n = 19) or LPSS(n = 20). There were no differences in demographics (table) or maximal tumor diameter ($p = 0.7569$). There were no conversions. Pringle manoeuvre was not used in both groups.There was no difference in peroperative central venous pressure. Operative time in the LLLS group was 100 (60–160) min and 150 (100–270) min in the LPSS group ($p = 0.0037$) with median intra-operative blood loss in the LLLS group of 50(0–550) ml versus a larger 150(50–700) ml ($p = 0.0191$) for patients receiving LPSS. No patients required transfusion. Intraoperative and postoperative complication rate was similar in both groups. Mortality rate was nil in both groups. Median hospital stay was 6 days in both groups ($p = 0.6382$).

Conclusion: LPSS in semiprone can be performed with similar clinical outcomes as a minor laparoscopic liver resection except for longer operative time and larger intraoperative blood loss without the need for transfusion.

	LLLS	LPSS	p-value
	N=19	N=20	
Age (years)	65 (27-85)	66 (23-82)	0.8196
BMI (kg/m²)	24 (19-36)	25 (21-31)	0.8993
Sex (M/F ratio)	6/13	6/14	1.000
Simultaneous laparoscopic colorectal resection	2	2	1.000
Operative time (min) *	100 (60-160)	150 (100-270)	0.0037
CVP parenchymal transection (mmHg)	2 (0-5)	2 (0-4)	0.8706
Pringle manoeuvre	0	0	1.000
Blood loss (ml)	50 (0-550)	150 (50-700)	0.0191
Conversion rate	0	0	1.000
Blood transfusion (%)	0	0	1.000
Intraoperative complication	1	1	1.000
Postoperative complications **	6	6	1.000
Mortality	0	0	1.000
Hospital stay	6 (3-16)	6 (4-11)	0.6382

Table: Data are presented as median (range). * operative time for procedures with simultaneous laparoscopic colorectal resections = time for laparoscopic liver resection only. **: only Clavien Dindo grade I and II.

OP-I.35 ASSOCIATING LIVER PARTITION AND PORTAL VEIN LIGATION IN STAGED HEPATECTOMY (ALPPS) IN SCANDINAVIA. A TRI-INSTITUTIONAL INTRODUCTORY FEASIBILITY STUDY

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Introduction: ALPPS has been introduced as an alternative to conventional portal vein embolization or – ligation (PVE/PVL) in patients with technically resectable liver tumors but insufficient future liver remnant. Initial experiences however, indicated that the complication rate and perioperative mortality following ALPPS exceeded that of PVE/PVL.

Materials and Methods: Thirty patients (19 males 11 females) were operated during a 5 month period at our three institutions. Underlying diagnoses were colorectal liver metastases (n = 23), Cholangiocarcinoma (n = 4), HCC (n = 2) and Carolis syndrom The number of lesions varied from 1–20. None of the patients had underlying liver disease.

Results: All patients completed the 2-stage procedure at a median of 8 days (7–15) following procedure 1. Twenty-three patients had extended right hepatectomies, wheras the remaining 7 had conventional right hemihepatectomies. Median hospital stay after the second procedure was 9.5 days (2–50). No perioperative mortality was observed. Complications according to Clavien-Dindo grading was 9 grade 1, 9 grade 2, 4 grade 3A and 3 patient with a grade 3b complication.
Discussion/Conclusion: ALPPS may be an alternative to PVE/PVL in some patients. An acceptable complication rate can be obtained if certain selection criteria are met. Many patients have early recurrences following ALPPS, and our short and intermediate oncological results will be presented. Randomized controlled trials are necessary to define what patients may benefit from ALPPS. A multicentre Scandinavian trial, LIGRO (ClinicalTrials.gov NCT02215577) has therefore been initiated and has been enrolling patients since May 2014.

[Correction added on 2 March 2015, after online publication. The abstract "OP-I.36 LIVER ABSCESS: A REVIEW OF MANAGEMENT AND CLINICAL OUTCOMES AT WESTERN HEALTH, AUSTRALIA" has been deleted.]

OP-I.37 **FACTORS PREDICITNG OUTCOMES IN NON-TRAUMATIC EMERGENCY HEPATECTOMYA NSQIP ANALYSIS**

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Introduction: Although non-traumatic emergent hepatectomies are rarely indicated, their burden to healthcare system in terms of utilization of resources is likely to be high, though has never been quantified.
Methods: Using the ACS-NSQIP participant use files for 2005–2012, we identified hepatic resections by Current Procedural Terminology (CPT) code and segregated all non-traumatic hepatectomies into 2 groups: Emergent Hepatectomy (EH) and Non-emergent Hepatectomy(NEH). Preoperative, intraoperative and postoperative factors were analyzed to identify predictors of complications and mortality.
Results: Of the 13227 non-traumatic hepatectomies from the NSQIP data, 137 emergency hepatectomies were identified. African Americans required significantly increased EH (2.0% vs 0.92%, OR 2.2, $p < 0.001$). The most common diagnosis for EH overall, was primary and secondary malignant neoplasm of the liver (38%; n = 33). Preoperative and perioperative transfusion requirements were higher in the EH group compared to NEH (17.5% vs 0.49%, OR 42.5, $P < .001$; and 52.7% vs 26.4%, OR 3.1, $P < .001$). Patients in the EH group were significantly more likely to experience a Clavien 4 complication (19.7% vs 7.2%, OR 3.2, $p < .001$). Mortality rate was higher in the EH group compared to NEH(8.8% vs 2.5%, OR 3.7, $P < .001$).A multivariate logistic regression analysis revealed ASA score, ascites, and emergent indication as poor outcome indicators. Surprisingly age and length of operation were not significant factors. (Table 1).
Conclusion: Emergent hepatectomy has a significantly higher perioperative blood transfusion requirement, with increased morbidity and mortality rate. ASA score, ascites, and emergent indication as poor outcome indicators, while age and length of operation were not significant factors.

Table 1: Multivariate Analysis

Characteristic	OR	95% CI	P value
Age	1.04	1.03-1.05	<0.00005
Frailty	1.43	1.26-1.62	<0.00001
Ascites	5.44	3.03-9.03	<0.00002
Weight loss	2.10	1.38-3.10	0.00029
Emergency	4.14	1.95-7.98	0.0006
Total left hepatectomy	0.53	0.28-0.93	0.0392
Total right heptectomy	1.97	1.45-2.65	<0.0009
Trisegmentectomy	2.21	1.54-3.13	<0.0009
OR time	1.00	1.002-1.004	<0.00007

OP-I.38 **DETECTION OF INVISIBLE LIVER TUMORS USING REAL-TIME VIRTUAL SONOGRAPHY**

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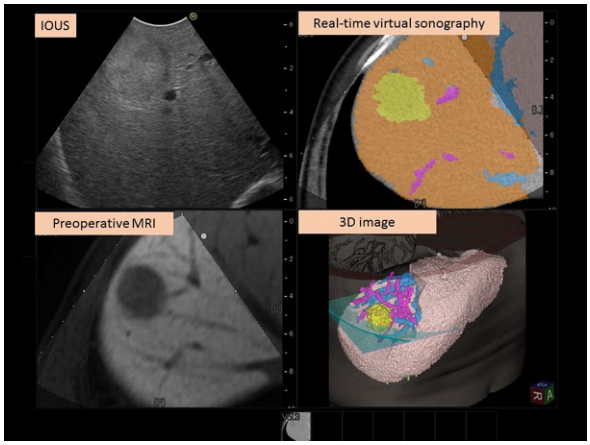
Introduction: Real-time virtual sonography is an innovative imaging technology that synchronizes an intraoperative ultrasonography (IOUS) with preoperative computed tomography (CT). We validated the effectiveness of the navigation system in 2 cases to locate liver tumors, which had been found in preoperative images and were difficult to detect using conventional intraoperative inspection.
Case 1: A 65-year-old man had a metastatic liver tumor from renal cell carcinoma. Preoperative CT revealed that the tumor was 6 mm in size, located in the deep segment 6. Intraoperatively, the tumor was not detected using plain and enhanced ultrasonography. Real-time virtual sonography projected the CT image of the tumor on IOUS image, which helped us to add mobilization of the liver. After mobilizing the liver towards the tumor location, we could find and resect the tumor using additional enhanced IOUS.
Case 2: A 58-year-old man had a 6 mm-hepatocellular carcinoma located in segment 4. He had a previous history of left lateral sectionectomy for hepatocellular carcinoma. The recurrent tumor located in the previous cut surface of the liver was not found by conventional IOUS because of the severe adhesion. We used real-time virtual sonography, which navigated us to dissect the adhesion towards the tumor.
Conclusions: A novel navigation system using real-time virtual sonography is helpful to locate small tumors that are difficult to find using conventional intraoperative inspection.



OP-I.39 THE NEED FOR HEPATOPANCREATOBILIARY SURGEONS: ARE THE COMMUNITY HOSPITALS UNDERSERVED?

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Introduction: Surgical educators have recently questioned if too many Hepato-Pancreato-Biliary (HPB) surgeons are being trained. While academic centers may be saturated, many community hospitals may be underserved. Thus, we sought to determine the need for an HPB surgeon at a tertiary care community hospital.

Methods: All abdominal computed tomography (CT) scans from February 2014 to May 2014 performed at a community teaching hospital were reviewed and scans with pertinent HPB pathology were isolated.

Results: A total of 389 CT scans having pertinent HPB pathology were identified from 3500 scans, for which an HPB surgeon consultation would be appropriate (Table 1). Out of the 291 patients with liver specific pathology, 17 patients had hepatic cysts >4 cm in size, 76 had a solid mass. Eighty three patients were found with pancreatic pathology, out of which 17 patients had cystic lesions >1 cm, 21 of them had a solid mass, 13 had non-specific main duct dilatation and 9 had chronic pancreatitis. Fifteen patients had biliary pathology including 11 with biliary ductal dilatation, one choledochal cyst and one extrahepatic bile duct stricture. For the 3 month study period, a total of 178 patients with significant HPB pathology were identified and the projected volume of patients will be over 700 for a period of 1 year that would require an HPB surgeon consultation.

Conclusions: The national need for HPB surgeons should be re-evaluated based on the workload at the community hospital setting and cannot be based on saturation at the academic hospitals.

Table 1:

Total (n=389)	Characteristic	n
Liver(n=291)	Cysts	
	<4cm	185
	>4cm	**17**
	Solid mass	**76**
	Other	13
Pancreas (n=83)	Cysts	
	<1cm	**10**
	>1cm	17
	Mass	**21**
	Main duct dilatation	**13**
	Chronic pancreatitis	**9**
	Other	13
Biliary (n=15)	**Stricture**	**1**
	Choledochal cyst	**1**
	Ductal dilatation	**11**
	Other	2

OP-I.40 EVALUATING THE IMPACT OF ADDING PERIOPERATIVE HOSPITALIST CO-MANAGEMENT ON OUTCOMES FOR PATIENTS UNDERGOING PANCREATICODUODENECTOMY

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Introduction: We hypothesize elderly patients, with multiple comorbidities, undergoing high risk surgical procedures will benefit from pre- and postoperative co-management by a hospitalist who specializes in this field. We report clinical outcomes for two cohorts of patients undergoing pancreaticoduodenectomy (PD), pre and post introduction of a perioperative hospitalist (POH) program.

Methods: Data was collected retrospectively on 89 consecutive patients undergoing PD between 2012 and 2014. Analysis was performed on 40 patients prior and 49 patients after the introduction of the POH program. Groups were compared by chi-square and T-test.

Results: Results are summarized in the table below. 14 patients in the post-POH cohort were not seen by the POH due to patient selection, distance and transportation issues. Although the ASA was significantly higher in the post-POH group, overall complication rates were similar. 30-day readmissions were also significantly lower in the post-POH group. There were 4 deaths observed in the post-POH group,

4 (8.2%) versus 0 in the pre-POH group. Deaths were due to amioderone related pulmonary fibrosis (1), cardiac arrest (1), and severe multi-organ failure related to a leak(1) and a postoperative bleed (1).

Conclusion: The introduction of a hospitalist who specializes in perioperative management of high-risk surgical patients was associated with a decrease in 30-day readmissions and a similar overall complication rate, even in the setting of a higher mean ASA. There was a trend toward a higher mortality rate in the post-POH cohort. More study is required to understand the overall quality and financial impact of POH co-management.

Table: Demographics, Complications – Clavien –Dindo Classification
*35 of 49 patients were seen by POH

Value	Pre-POH N = 40	Post-POH (all) N = 49*	p Value
Age median (range)	61 (25-83)	63 (19-91)	0.449
ASA 1,2 ASA 3,4	19 (47.50%) 21 (52.50%)	9 (18.36%) 40 (81.63%)	0.005
LOS, days, median (range)	11 (5-63)	12 (5-256)	0.785
RRT	4 (10.00%)	4 (8.16%)	1
Unplanned ICU transfer (floor-ICU)	4 (10.00%)	5 (10.20%)	1
AMI/PE on floor	3 (7.50%)	1 (2.00%)	0.323
Re-admit < 30 days	12 (30.00%)	3 (6.12%)	0.004
Minor	26 (65.00%)	25 (51.02%)	0.203
Major	4 (10.00%)	3 (6.12%)	0.696
Mortality	0	4 (8.16%)	0.124

OP-I.41 PERSONALITY TRAITS COMMON AMONG HEPATO-PANCREATO-BILIARY SURGEONS AND THEIR RELATIONSHIP TO JOB SATISFACTION

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Background: Personality may influence career choice, and can predict job satisfaction. The purpose of this study was to evaluate the personality traits of hepato-pancreato-biliary (HPB) surgeons and to determine whether they correlate with job satisfaction.

Methods: A web-based survey of surgical members of the AHPBA was conducted. Personality traits and job satisfaction were assessed using the Big Five Inventory and the Brief Index of Affective Job Satisfaction instrument.

Results: One hundred and thirty-six HPB surgeons completed the survey, 22% response rate (86.8% male, 70.7% >40 years old, 85.3% completed fellowship training, 50% >10 years in practice, and 76.5% academic practice). HPB surgeons scored higher on extraversion and conscientiousness, and lower on neuroticism ($p < 0.001$) compared to a normal population sample (n = 71,867). High extraversion ($p = 0.02$) and low neuroticism ($p < 0.001$) independently correlated with job satisfaction. Job satisfaction was higher among females ($p = 0.004$). While 91.9% of respondents indicated that they would choose the specialty again, only 53.7% would recommend it to their child/family. Those who would choose the specialty again were less neurotic ($p = 0.039$) and more satisfied with their job ($p = 0.003$). Additionally, those who would recommend the specialty were more agreeable ($p = 0.001$), more satisfied ($p = 0.002$), have been in practice longer ($p = 0.006$), and were more likely to choose the specialty again ($p < 0.001$).

Conclusion: Extraversion and neuroticism correlate with job satisfaction among HPB surgeons. Furthermore, female HPB surgeons appear to have higher levels of job satisfaction. These findings may aid in the recruitment of HPB trainees and may have implications for job performance and patient care.

OP-I.42 IMPACT OF FOCUSED NURSING EDUCATION CURRICULUM IN THE CARE OF HEPATO-PANCREATO-BILIARY (HPB) SURGICAL PATIENTS

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Nurses provide point of contact care for HPB surgery patients. To improve patient education, nurse-physician communication, and nursing comfort with complex HPB patient care, we offered a six hour nursing targeted, educational course, to all nurses from inpatient units at a large, tertiary care hospital. Topics included anatomy, pathology, surgical procedures, nutrition, and pre/post-operative care of the HPB surgical patient. Two weeks prior to the course, a 30 question pre-test was distributed to all participants: 20 questions regarding HPB disease processes, 4 regarding the participants' background, and 6 describing comfort level, physician communication, and experience caring for HPB patients. The same test was given to participants following the course and scores were compared. Descriptive statistics were performed, survey results tallied. 59 nurses participated in the course: 50 completed the pre-test and 25 completed the post-test. 50% of respondents reported nursing experience of less than 5 years. 68% reported working with HPB surgery patients over half of their shifts. Average pre-test score was 11.1 (55.6%) and post-test was 12.5 (62.5%), an increase of 13.5% ($p < 0.01$). Nursing confidence, comfort, and communication in the care of HPB surgery patients increased by 37.1% ($p < 0.01$). The percentage who felt completely confident in answering patient questions regarding HPB diseases more than doubled (38.9% to 84.1%). Our focused HPB nursing core curriculum course was associated with improved understanding of HPB anatomy and disease processes and increased nursing confidence in caring for HPB surgical patients. We hope this will translate to improved patient care and nursing-physician communication.

OP-I.43 OPEN DATA FOSTERS QUALITY OUTCOMES FOR HPB SURGERY: RESULT OF 1625 PANCREATIC AND HEPATIC RESECTION

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Introduction: Healthcare economics is driving hospital to deliver improved "pay for performance" for all surgical programs. Much of the data regarding efficiency and performance is not actionable on an individual surgeon level as it is kept mostly anonymous. We hypothesize that the development of the Center of Excellence initiative for HPB surgery within KP integrated health care system which comprised of 21 medical centers, can improve surgical outcome by firstly improve individual surgeon performance.
Methods: All HPB cases from 2008 to 2014 were retrospectively analyzed. Three-time periods were chosen, and data were given to all HBP surgeons. The first set of data served as a baseline to provide transparency of operative time (OR) and length of stay (LOS). The second set of data was prospective obtained during the initiation of program development The third set of data showed the result of the implementation of such program including a bi-weekly conference to discuss multifaceted best practices.
Results: See Graph
Conclusion: Transparency of surgical data allows surgeons to self-identify potential surgical outliers among their peers. A continuous open discussion of "best practice" in terms of detail surgical technique, intra-operative management and post-operative allows a gradual transition of "coaching" away from their personal preference. A critical review of data and discussion of best practice allows for systematic change in efficient surgical technique as well as discharge criteria.

		Pancreas			Liver	
	n	*OR time*	*LOS*	*n*	*OR time*	*LOS*
2008 to 2011	580	368	13	488	227	5.6
2013	157	420	12	161	264	5.9
2014 Jan-Jun	116	354	9.5	123	228	4.9
		P=.60	*p=.20*		*p=.89*	*p=.16*

OP-I.44 DUODENAL NEUROENDOCRINE TUMORS – LOCATION MATTERS

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Objective: Duodenal neuroendocrine tumors are rare. Historically, when feasible a less aggressive surgical approach is always considered to treat these tumors. The aim of this study was to identify factors associated with necessity for more aggressive surgical procedures.
Method: All patients who underwent surgery for duodenal neuroendocrine tumor between September 2005 and June 2014 have been identified retrospectively in our database. Data collected included clinical presentation, operative findings and histopathological data.
Results: 18 patients were identified that underwent surgical management for duodenal endocrine tumors. This included 2 patient with transduodenal excision (11%), 2 patients with duodenal resection (11%), 6 patients had antrectomy (33%) and 8 underwent pancreaticoduodenectomy (44%). On analysis, peri-ampullary location was the most common site of duodenal endocrine tumors (n = 9, 50%). 77% (n = 7) of peri-ampullary lesions led to pancreaticoduodenectomy. The odds of having a pancreaticoduodenectomy is 10 times higher when the lesion is in peri-ampullary location. 6 patients had positive lymph nodes. The odds of having a positive lymph node are almost 9 times higher when the lesion is in ampulla. 83% (n = 5) of tumors with positive lymph nodes were greater than T1 stage. The odds of having positive lymph node is 3 times higher when lesion is greater than T1.
Conclusions: Ampullary location of neuroendocrine tumor in duodenum is associated with higher odds of lymph node positivity and need for treatment with more extensive procedures like pancreaticoduodenectomy.

OP-I.45 EARLY POST-OPERATIVE HYPOPHOSPHATEMIA AS A NOVEL PREDICTOR OF ANASTOMOTIC FAILURE AFTER PANCREATIC RESECTION: A RISK-PREDICTION TOOL

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Introduction: Leak-related complications (LRC) remain serious potential sequela of pancreatic resection. Current LRC risk assessment is inadequate and rarely affects management algorithms. Hypophosphatemia appears to correlate with infective complications after some abdominal operations. This study evaluates early post-pancreatectomy hypophosphatemia as a predictor of LRC.
Methods: Consecutive patients who underwent pancreaticoduodenectomy or distal pancreatectomy were analyzed. LRC were defined as pancreatic leak, fistula, or abscess; only grade 2 or higher LRC were recorded. Postoperative serum phosphate levels and other recognized LRC risk factors (duct diameter, soft pancreatic parenchyma, high-risk pathology, excessive blood loss, procedure type, and preoperative chemotherapy) were analyzed. Factors significant on multivariate analysis were used to construct an LRC risk prediction model.
Results: From 2011 through 2012, 465 patients were included with a median age of 66 years. LRC (grade >2) were recorded for 85 patients (18%). Univariate analysis identified the following predictors of LRC: hypophosphatemia on postoperative day 3 ($p = 0.006$), small duct diameter ($p = 0.007$), soft gland consistency ($p = 0.002$), and intra-operative blood loss >400 cc ($p = 0.01$). Hypophosphatemia on postoperative day 3(OR = 2.2, CI: 1.1–4.5), soft gland consistency(OR = 3.1, CI: 1.7–6), and intra-operative blood loss >400 cc(OR = 2.3, CI: 1.3–4) remained significant on multivariate analysis and were used to construct an LRC risk prediction tool, which had a negative predictive value of 93% and a c-index of 0.68(Table 1).

Conclusions: Early post-operative hypophosphatemia is an independent predictor of LRC. A simple LRC risk prediction tool that includes this variable accurately identified low-risk patients and may help identify those most likely to benefit from enhanced postoperative recovery pathways.

Table 1. LRC risk-score and a risk-prediction tool.

Risk-score[a]	Predicted risk of LRC	Risk-group	Predicted risk of LRC
0	4.3%	Low risk[b]	7.4%
1	8.2%		
2	20.7%	High risk[c]	25.1%
3	37.1%		

[a] Risk-score assigns 1 point for any of the following independent LRC predictors: hypophosphatemia on post-operative day 3, soft gland consistency, or intra-operative blood loss more than 400cc.

[b]Defined as any patient with a risk score of 0 or 1. This model identifies the low-risk group with a negative predictive value of 93%.

[c]Defined as any patient with a risk score of 2 or 3.

OP-I.46 SURVIVAL FOLLOWING PANCREATICODUODENECTOMY FOR STAGE 1A PANCREATIC ADENOCARCINOMA IS NOT IMPROVED BY MULTIMODALITY TREATMENT

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Introduction: Pancreaticoduodenectomy is an integral part of pancreatic adenocarcinoma treatment. NCCN guidelines recommend patients undergo multimodality therapy, but few studies validate its significance in early stage patients.
Methods: Using NCDB from 1998–2006, patients who underwent a pancreaticoduodenectomy were identified. Patients with invasive histology and stage 1 disease were included. X^2 test was used for categorical variables. Median survival was estimated using Kaplan-Meier method with log-rank comparison and Cox regression.
Results: Over 8 years, 2,801 patients were identified. Median overall survival for Stage 1A (n = 1047) and Stage 1B (n = 1776) was 31.8 and 23.2 months with a median overall follow-up of 23.7 months (0–172.9). Stage 1B patients were more likely to have higher grade tumors ($p = 0.002$), receive chemotherapy ($p = 0.007$) or radiation ($p = 0.002$) and have positive margins ($p < 0.0001$). There were no differences between groups with respect to lymph node yield (LN) or type of treatment facility. For both stages, chemotherapy, radiation, LN yield ≥17 nodes, age <70, tumor grade and facility type were associated with an improved overall survival on univariate analysis. However on multivariate analysis, for Stage 1A patients only LN yield ≥17 was independently predictive of survival while chemotherapy, radiation, facility type, age and sex had no impact on survival. For patients with Stage 1B, chemotherapy, age <70 and LN harvest ≥17 were associated with an improved overall survival on multivariate analysis.
Conclusion: Despite guidelines recommending multimodality treatment for pancreatic adenocarcinoma, there is no improvement in survival for patients with Stage 1A disease. A surgery only approach should be considered for these patients.

FRIDAY, MARCH 13, 2015, 6:30PM–7:30PM COCKTAIL VIDEO PRESENTATION

VC.01 TOTAL LAPAROSCOPIC CENTRAL PANCREATECTOMY WITH PANCREATIGOGASTROSTOMY FOR HIGH RISK CYSTIC NEOPLASM

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Background: Organ-sparing pancreatic resection is important in prophylactic surgery for cystic neoplasms. There is controversy regarding the optimal surgical approach for pancreatic lesions in the neck or proximal body of the pancreas. Central compared to distal pancreatectomy is technically more challenging but preserves more functional pancreatic tissue. Due to the prophylactic nature of the surgery and long survival of patients with benign and borderline malignant lesions, surgeons need to stratify greater importance to surgical morbidity and sparing pancreatic parenchyma.
Patient: The patient is a 59-year-old active woman with a symptomatic cystic neoplasm of the pancreas exhibiting high risk imaging features. The cyst of 2.2 × 1.8 cm in the body of the pancreas was impinging on the portal venous confluence.
Technique: The patient was positioned in the French Position, the lesser sac was opened and the pancreatic body exposed. A retropancreatic tunnel was created with staple division of the neck. The body was mobilized off the portal vein and splenic vessels transected. A retrogastric pancreaticogastrostomy was sewn through an anterior gastrotomy. The stent was delivered past the pylorus to decrease pancreatic enzymatic activation.
Conclusion: Laparoscopic ultrasound helps in defining cyst borders and minimal blood loss optimizes visualization during the dissection. A minimally invasive pancreaticogastrostomy created through an anterior gastrotomy is technically feasible and safe. This approach can minimize the morbidity of prophylactic pancreatic surgery for patients with cystic neoplasms. Nevertheless, it should not compromise safety, oncologic completeness or an organ-sparing approach.